

# Satellite RGBs for NWS Forecasters with Color Vision Deficiency

Katie Vigil, Emily Berndt, Kim Runk, Chad Gravelle, and Matthew Foster



# What is Color Vision Deficiency?

**The inability to distinguish certain shades of color**

**X-linked recessive disorder**

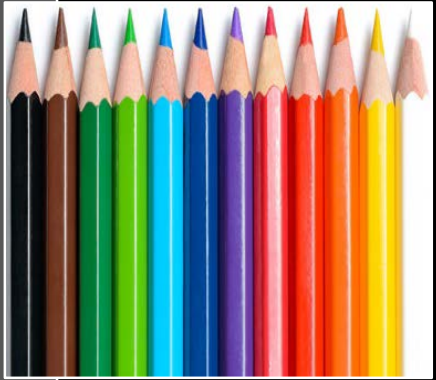
**8% men with Northern European ancestry**

**0.5% women with Northern European ancestry**

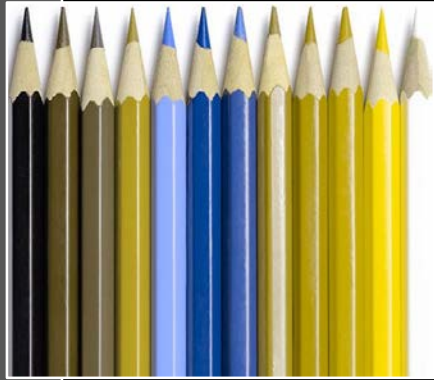
**There is currently no cure for inherited CVD**



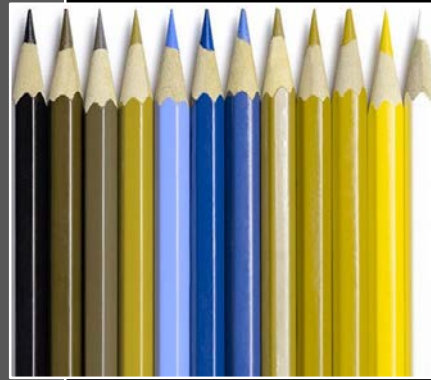
# Types of Color Vision Deficiency



**Normal**



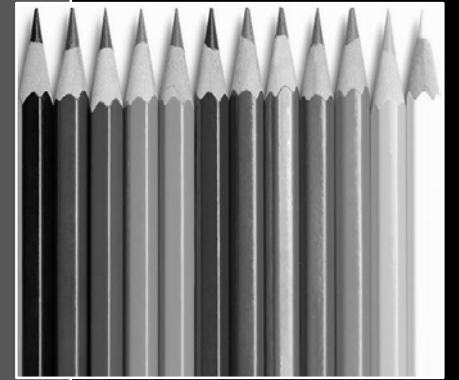
**Deuteranopia**



**Protanopia**

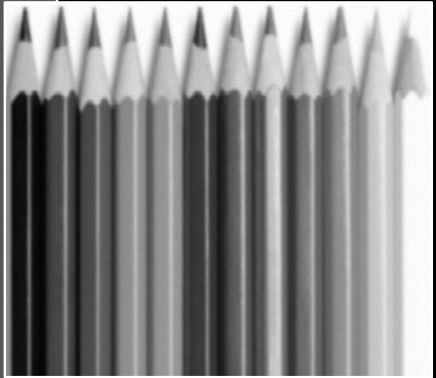


**Tritanopia**



**Achromatopsia**

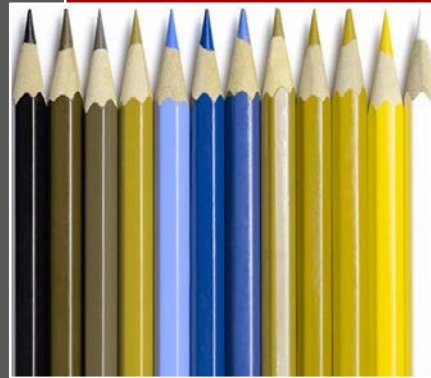
# Types of Color Vision Deficiency



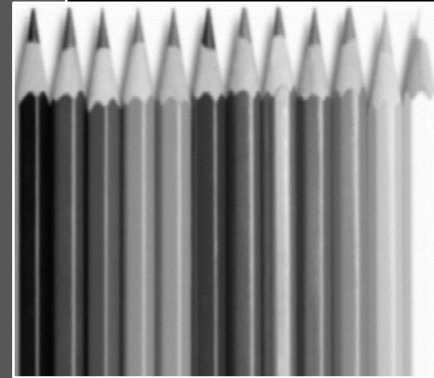
**Normal**



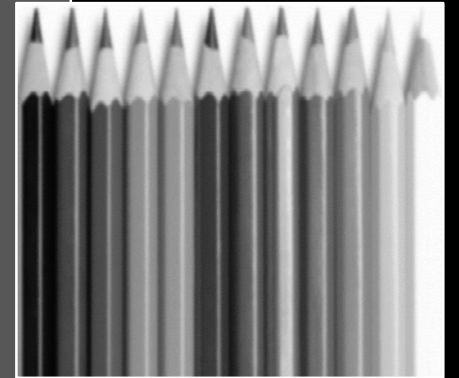
**Deuteranopia**



**Protanopia**



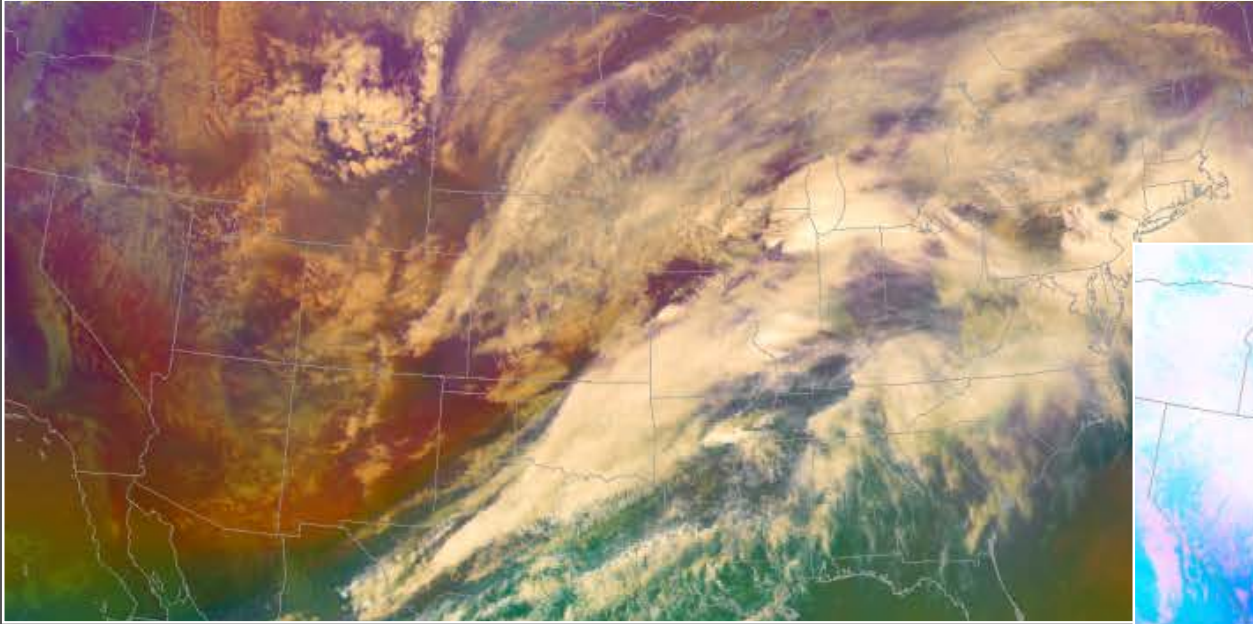
**Tritanopia**



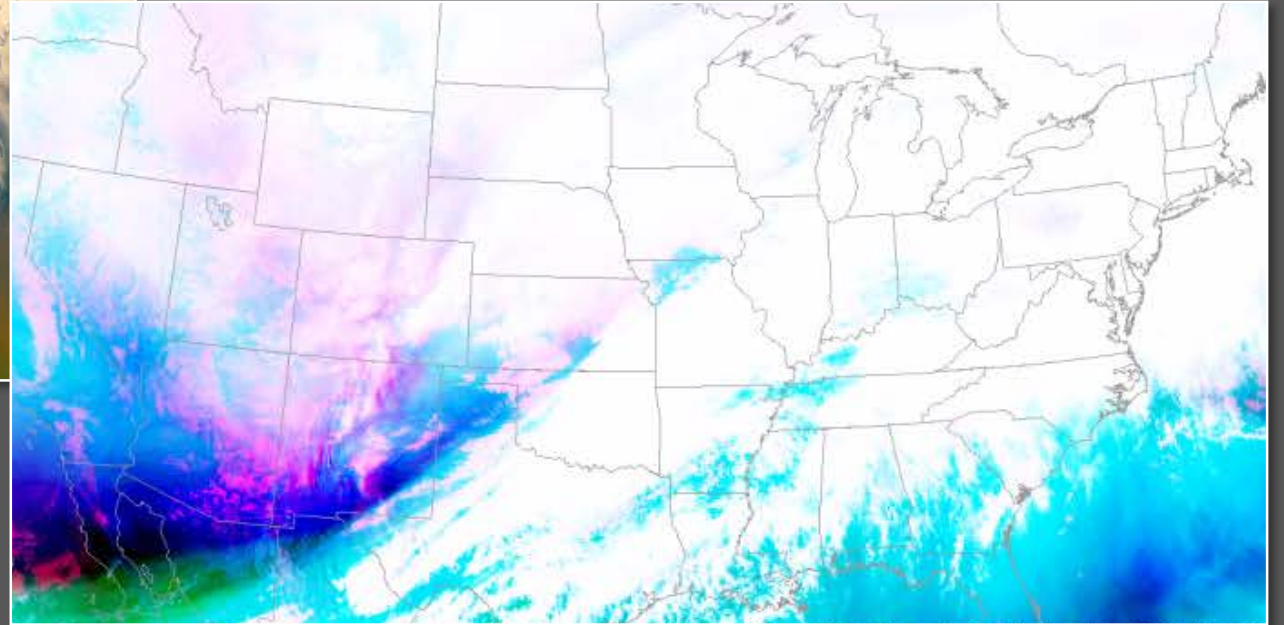
**Achromatopsia**



# Which RGBs are Difficult to Interpret?

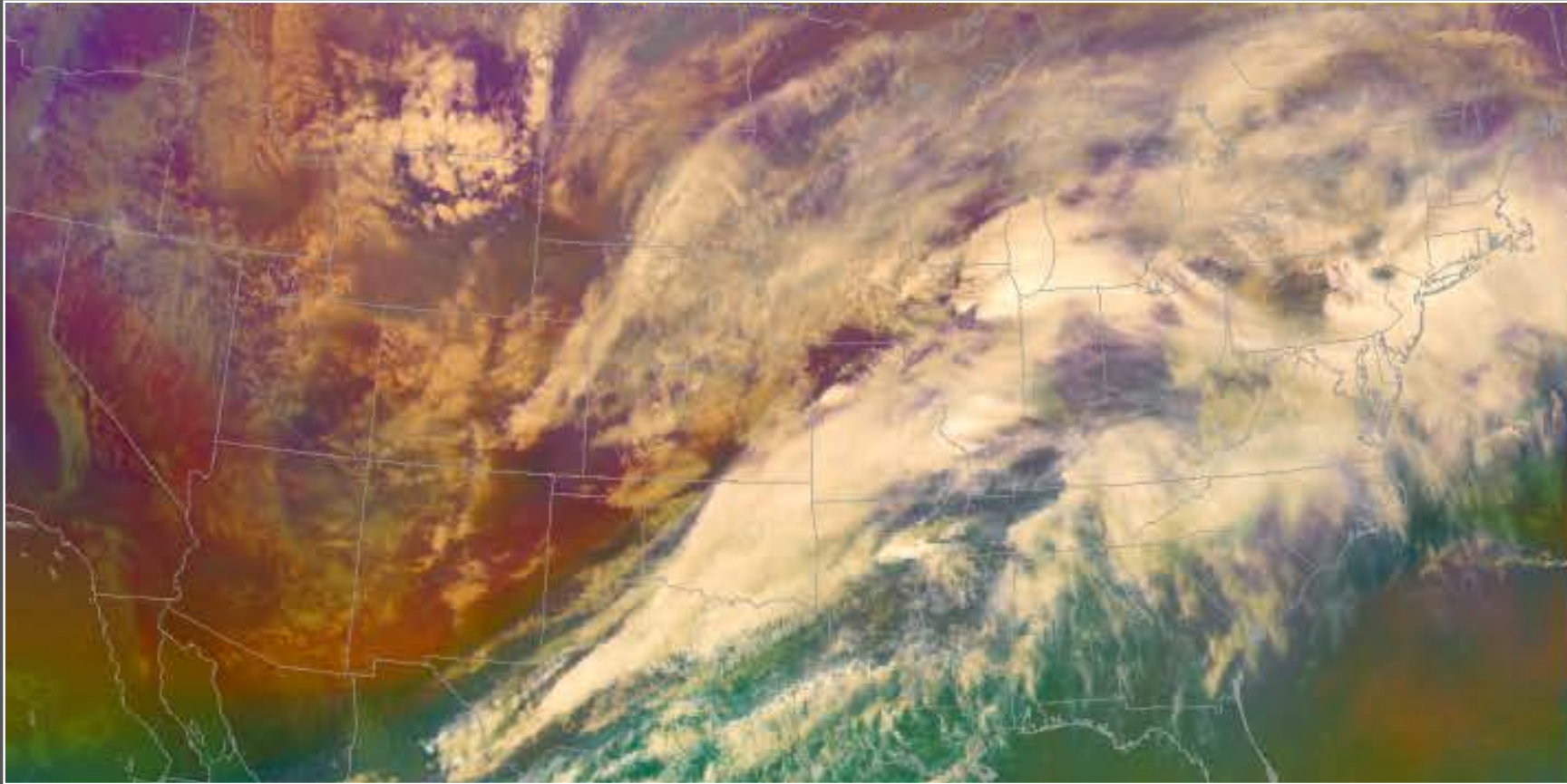


**Airmass RGB**



**Simple Water Vapor RGB**

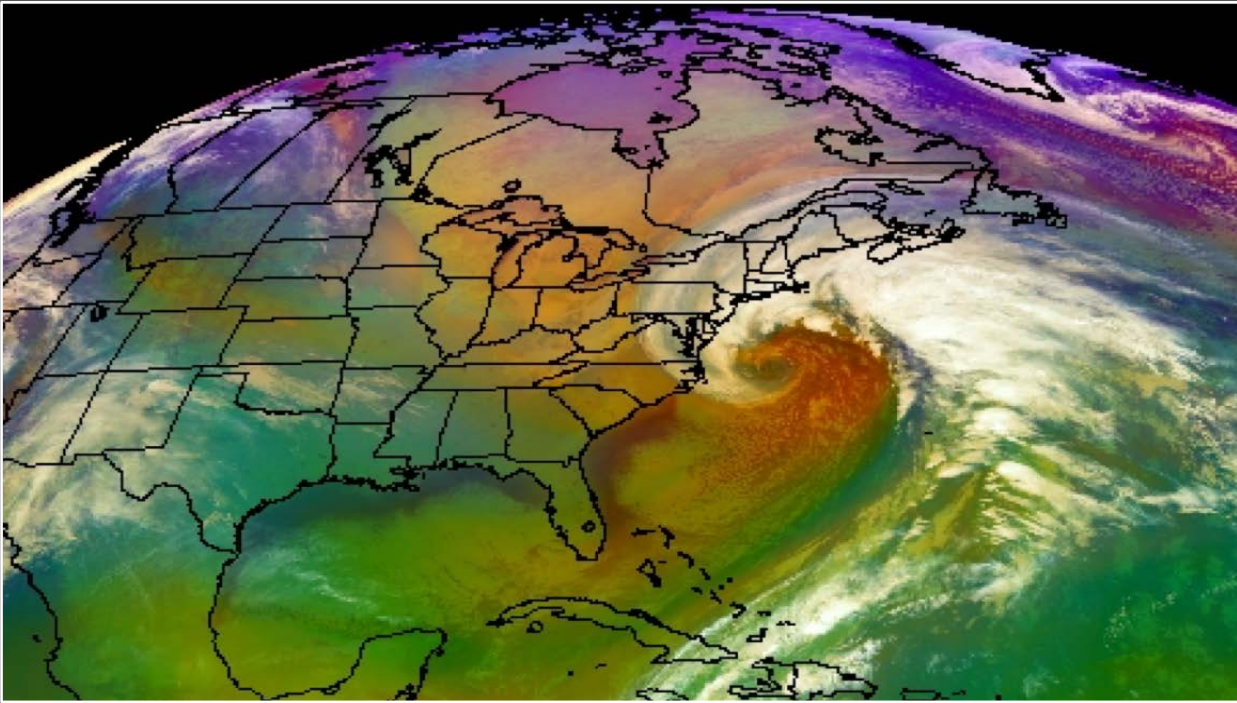
# Which RGBs are Difficult to Interpret?



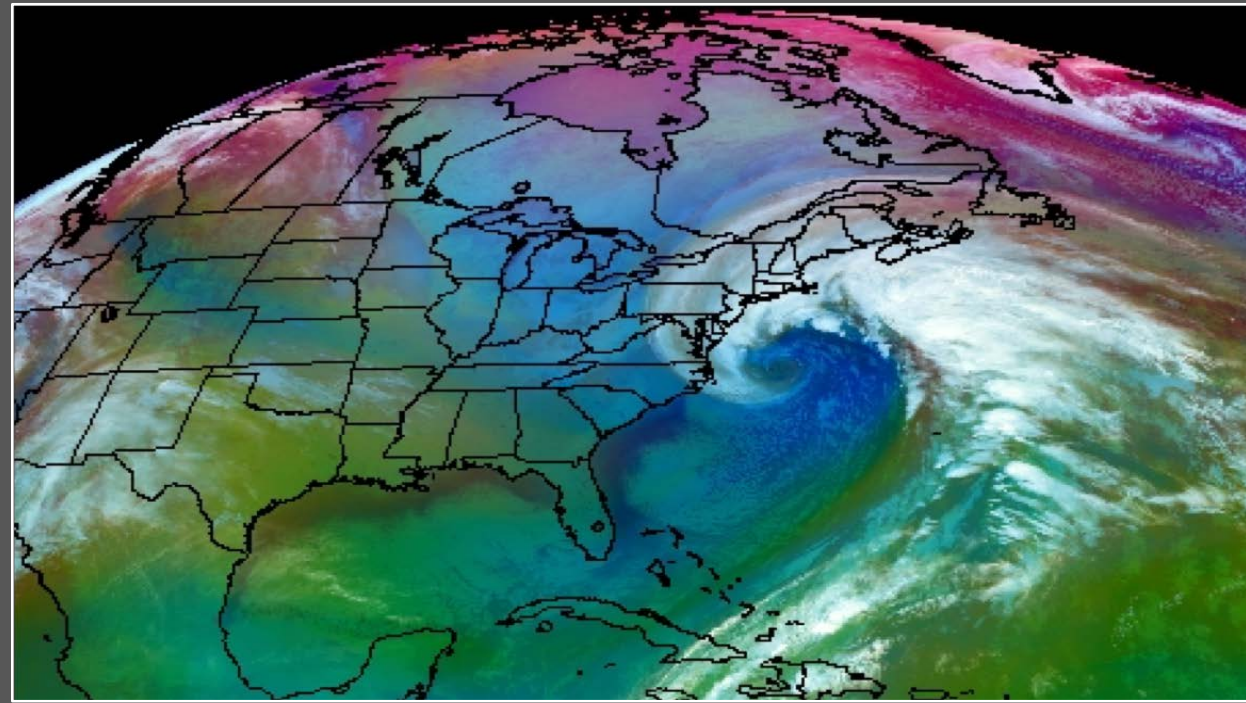
**Airmass RGB**



# Creating a New RGB

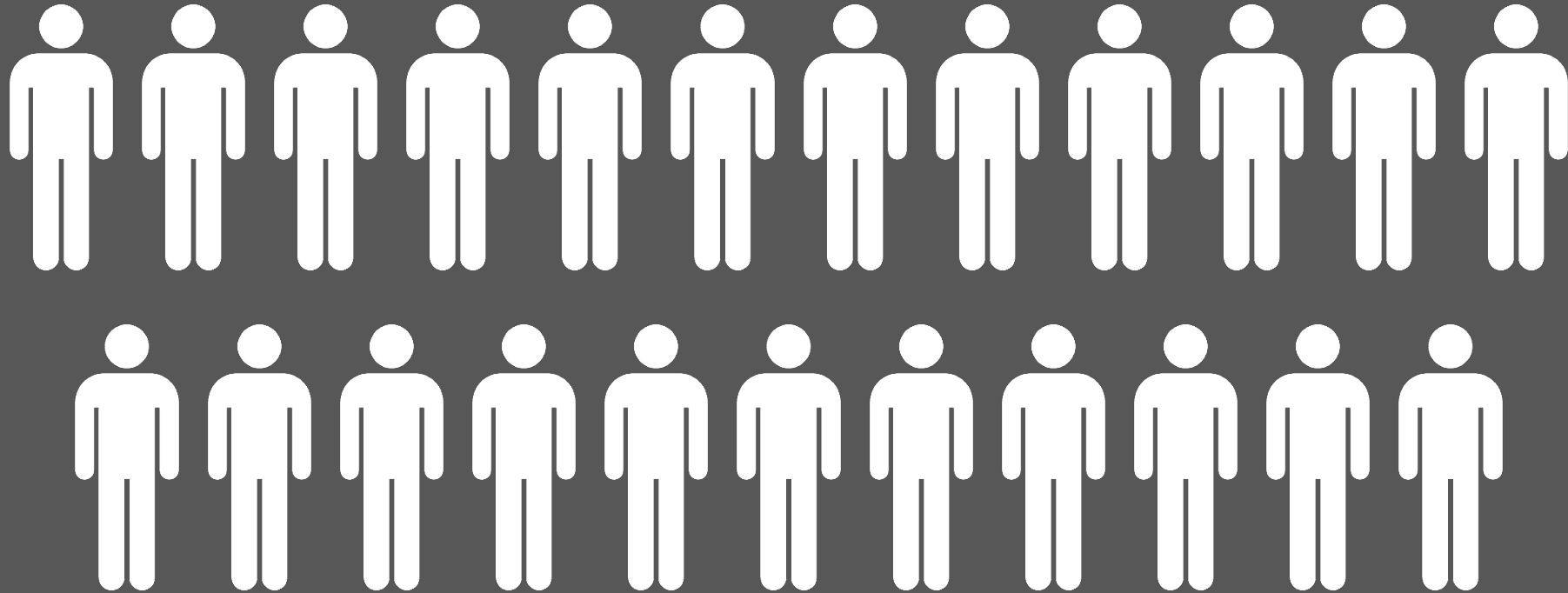


Airmass RGB



New Airmass RGB

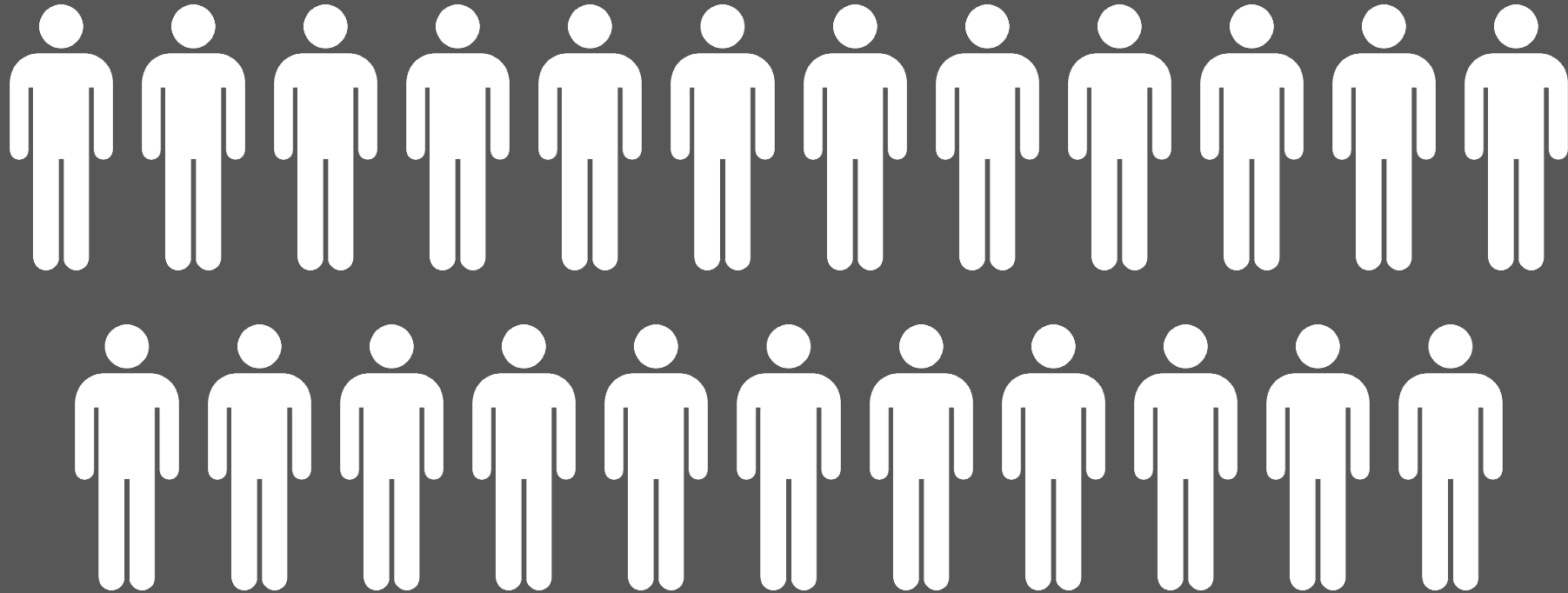
# Survey Results



**23 NWS employees with Color Vision Deficiency responded**

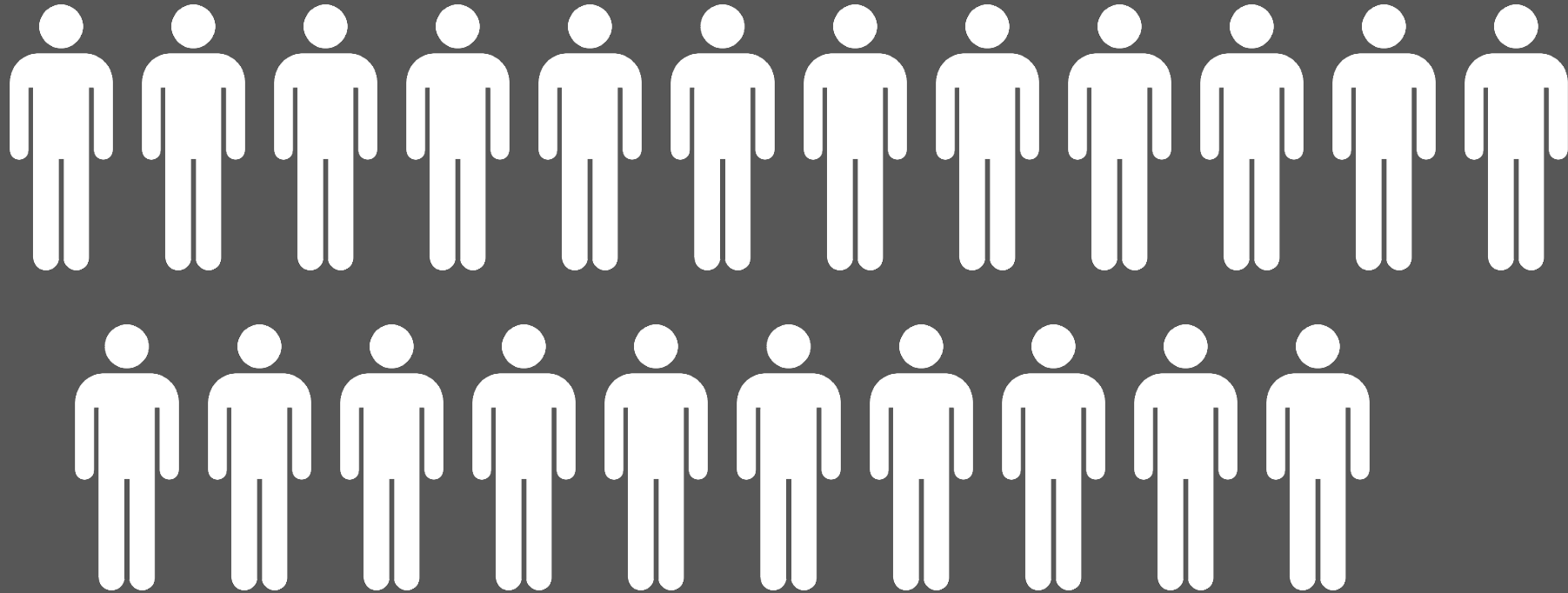


# Survey Results



**96% (22) of those 23 respondents have deuteranopia or protanopia**

# Survey Results



**86% (19) of those 22 respondents felt that the New Airmass RGB  
was at least slightly easier to interpret**

# Survey Results



**21% (4) of those 19 respondents felt that the New Airmass RGB was significantly easier to interpret**

# Survey Results



**42% (8) of those 19 respondents felt that the New Airmass RGB was moderately easier to interpret**




# Survey Results




**37% (7) of those 19 respondents felt that the New Airmass RGB was slightly easier to interpret**

# Future Work







 **Color Vision Deficiency Group**  
Public

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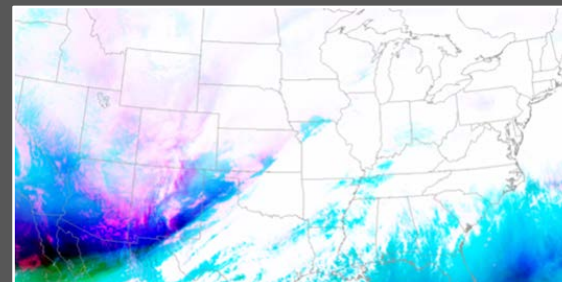
**Welcome to the Color Vision Deficiency Group!**

This community is for NOAA employees with Color Vision Deficiency (often referred to as color blindness) and for people doing research in this area. This community will be a place to share research, color maps and curves, techniques for improving color interpretation, and general support. The idea for this community came from an evaluation that was conducted in the Operations Proving Ground in April of 2017. National Weather Service forecasters with Color Vision Deficiency (CVD) evaluated new GOES-16 RGB imagery. Their goal was to determine which RGBs were the most useful and which RGBs were difficult to interpret due to their color table. They also tested technology that was designed to improve color vision for CVD individuals. The results of this evaluation are located under the Research tab. During discussions for this evaluation it was determined that there needs to be a place where people can go to share their experience with CVD and solutions they have created to help them in their work environment. Thus we have created the Color Vision Deficiency Group community. Thank you for visiting!



[Research](#) [Satellite RGBs](#) [Color Curves](#) [Blog](#) [Forums](#) [Contact Us](#)

2018 NOAA Virtual Lab



## Color Vision Deficiency RGB Survey

If you are a NWS forecaster and have color vision deficiency (more commonly known as color blindness), please take the time to fill out this survey to help us with the creation of a new Airmass RGB that may be easier to interpret for individuals with color vision deficiency. All responses will remain anonymous.

[NEXT](#)

Never submit passwords through Google Forms.

2018 Google

# References

**Google Forms, cited 2018: [Available online <https://docs.google.com/forms>]**

**National Eye Institute, cited 2018: Facts About Color Blindness. [Available online [https://nei.nih.gov/health/color\\_blindness/facts\\_about](https://nei.nih.gov/health/color_blindness/facts_about)]**

**NOAA Virtual Lab, cited 2018: Color Vision Deficiency Group. [Available online <https://vlab.ncep.noaa.gov/group/color-vision-deficiency-group>]**

**Royal National Institute of Blind People, cited 2018: Colour Vision Deficiency. [Available online <https://www.rnib.org.uk/nb-online/colour-vision-deficiency>]**

# Questions or Comments

**Please contact Katie Vigil: [katie.crandall@noaa.gov](mailto:katie.crandall@noaa.gov) or [katie.c.vigil-1@ou.edu](mailto:katie.c.vigil-1@ou.edu)**

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